CLINICOMYCOLOGICAL STUDY OF TINEA CORPORIS

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ABSTRACT

BACKGROUND

Tinea corporis refers to all dermatophytoses of glabrous (relatively hairless) skin except the palms, soles and groin. Identification of dermatophytic species in clinical settings are important not only for epidemiology but also for the treatment.

OBJECTIVES

Present study was carried out to find out the clinical variants of tinea corporis and species of fungus responsible for the disease in patients attending Outpatient Department of Dermatology, Venereology and, Leprology, Osmania General Hospital, Hyderabad. It may help in identifying any yet unrecognised changing trend in this aspect of the disease.

METHODS

The prospective observational analysis of 100 clinically suspected cases of tinea corporis attending DVL Department, Osmania General Hospital, Hyderabad. Skin scrapings were collected and processed according to standard protocol.

RESULTS

Maximum number of patients enrolled in study were reported for treatment 5-8 weeks after the onset of disease. Overall male predominance was observed and ages between 20-29 years (39%). 82% of samples were positive on direct microscopy and 58% positive on culture. Trichophyton rubrum was the commonest species isolated (79.3%), followed by Trichophyton mentagrophytes (13.79%).

CONCLUSIONS

The study highlighted tinea corporis clinical variants with male predominance. Overall, predominant causative fungal species isolated was Trichophyton rubrum. No species specificity was noted in any clinical pattern, all species were isolated from all the clinical variants except for plaque type of lesions in which Trichophyton verrucosum was isolated more frequently.

KEYWORDS

Dermatophyte, Epidemiological Factors, Superficial Infection, Fungal Species.

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INTRODUCTION: The prevalence of dermatophytosis varies from place to place throughout the globe and reported to be variable in different parts of same continent. In tropical and subtropical countries it occurs in increased frequencies.[1] There are about 40 species of dermatophytes reported to be pathogenic to human being and are classified according to their habitats e.g. anthropophiles (from human sources), zoophiles (from animal sources, cats, dogs, cattle, horses, birds or other animals) or geophiles (from soil sources).[1,2] Clinically, the different types of dermatophytosis are classified according to body site involvement.[3] Despite the availability of effective antifungal agents, dermatophytic infections continue to be one of the principal dermatophytic diseases throughout the world especially in tropical countries.

Iatrogenic immune suppression in cases of organ transplantation and immunotherapy of various medical conditions, HIV infection further predispose person for extensive resistant type of dermatophytosis.[4]

The need for species identification of dermatophytes in clinical setting is of epidemiological concerns. The genus Trichophyton infects hair, nail and skin. Microsporum genus infects hair and skin only whereas the genus Epidermophyton infects skin and nails. Infection may have animal carriers or linked to recurrent institutional or family outbreaks, may reflect exposure during travel or residence in the area of endemicity or contact with a person with such disease, thus it is important for infection control and public health issues as well.[1] Although dermatophytic infection can be diagnosed by clinical presentation and fungus can be demonstrated by easy laboratory procedures like direct microscopy (KOH mount). Fungal species responsible for the

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infection can be identified by colony characteristic and pigment production.

Currently, fungus responsible for the infection can be identified with great precision by modern technologies like-PCR and Nucleic acid based tests.[5,6]

AIMS AND OBJECTIVES: The purpose of the study was:

- To study the incidence of tinea corporis among the patients attending the outpatient Department of DVL, Osmania General Hospital.
- To assess the age and sex incidence of Tinea corporis.
- To identify the most common species causing Tinea corporis.
- To study clinicomycological correlation of various clinical variants of Tinea corporis.

Present hospital based observational study was carried out to find out the prevalence of tinea corporis, its clinical presentation and species of fungi responsible for the disease in Hyderabad.

MATERIALS: It is a prospective observational analysis of study. Clinically suspected 100 cases of tinea corporis were included in our study between September 2010 to August 2011. Study was conducted at Department of Dermatology Venereology and Leprosy, Osmania General Hospital, Hyderabad.

Inclusion Criteria: Patients with Tinea corporis and were not on treatment for the disease.

Exclusion Criteria: Patients who are already receiving topical or systemic antifungal therapy for tinea corporis or some other fungal infections were excluded from the study.

Prior to the collection of data, the nature of research was explained to the participants and a verbal consent was taken from them.

METHODS: Patients were clinically examined and patient's data were recorded on proforma with particular reference to onset of disease, duration and site of involvement, type of initial lesion and progression, associated dermatosis and systemic illness in past and familial occurrence of similar disease. Patients on topical and systemic antifungal treatments were excluded. Screening for ELISA for HIV infection was performed in extensive tinea infection. Skin scrapings were collected according to standard protocol.

Direct microscopy of the samples was performed at the Department of Microbiology. The Skin samples were kept in KOH for 30 minutes. Samples for culture were collected under sterile precautions and transported to the Department of Microbiology for culture and species identification. Skin samples were inoculated on same day on selective medium with antibiotic. Sabouraud Cycloheximide Chloramphenicol Agar was used in this study. Reverse side of the bottles were observed daily for growth, if no growth was observed at the end of four weeks, culture was labelled as negative and agar was discarded. When growth was present, then morphology, colour, colony texture and pigmentation of the growth was noted. Lactophenol cotton blue mounts were prepared for the identification of the structure and morphology of the spores. The species were identified by noting their characteristic features such as the conidia and hyphae. Clinical photograph of representative skin lesions and colony characteristics of fungus species identified were taken. Microscopic picture of Lactophenol blue preparation of fungal culture were taken for the identification of species.

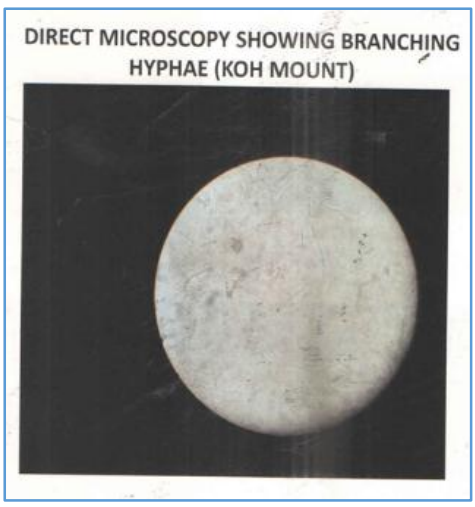
Dextrose: 40 g.
Peptone: 10 g.
Agar: 20 g.
Distilled water: 1000 mL. (The final pH was adjusted to 5.6)

Slide Culture Technique: A sterile glass slide was placed on a bent glass rod at the bottom of a petri dish. A piece of one square centimetre block of Sabouraud dextrose agar or potato dextrose agar was placed on the slide. The fungal strain under identification was inoculated at the four sides of agar block, it was covered with a sterile cover slip and inoculated at room temperature. When growth appeared, a Lactophenol cotton blue was placed on the slide and examined under the microscope for colony details.

RESULTS AND DISCUSSION: Majority of patients reported for the treatment 5-8 weeks after onset of disease. Tinea corporis was common in male as compared to female (1.63:1). Majority of the patients belonged to the age group of 20-29 years; followed by 18% in the age group of 30-39 years; only 1% was noted in the age group of 70-80 years. Most common clinical type observed in our study was annular type 72%, followed by plaque type 18%, eczematous type in 10% patients. Majority of patients had 2 lesions, followed by single lesion in 26% patients. The lesions of tinea corporis were most commonly noticed in the unexposed areas (71.31%), abdomen was the area which was more frequently involved. Direct microscopic examination (KOH) of the samples revealed overall 82% positive for fungus while 58% cases were culture positive. The predominant species of dermatophyte isolated was Trichophyton rubrum 79.3%, followed by T. Mentagrophytes 13.79%, T. verrucosum 6.89% of isolates.

Clinical variants	No. of patients	Percentage
Annular	72	72%
Plaque	18	18%
Eczematous	10	10%
Total	**100**	**100%**

Table 1: Clinical Variants



KOH mount	Number	Percentage (%)
Positive	82	82
Negative	18	18

Table 2: Direct Microscopy

Out of 100 cases studied, 82% were KOH positive, 18% were negative.

In the present study, the incidence of tinea corporis among other dermatophytosis is 43.95% which is comparable with the observation of Verenkar et al,[7] Smita Sharma, A K Borthur,[8] Agarwal et al[9] Sen and Rasul[10] with the incidence of 40%, 42%, 43%, 48% respectively. Bindu V, Pavitran K[11] in Calicut reported the incidence of tinea corporis 53.6% among other dermatophytes. Variation could be due to difference in the case selection, geographical areas and habits of the persons. In the present study, 39% of patients belonged to the age group of 20-29 yrs., which is comparable with Korean study by Jang Su Jeong et al[12] who reported the highest incidence in the age group of 20-29 yrs. with 30.6%. Males were more affected than females with the male-female ratio of 1.63:1. 75% patients belonged to lower socioeconomic group.

Socioeconomic status	Number of cases	Percentage (%)
Upper class	0	0
Upper middle class	2	2
Lower middle class	23	23
Upper lower class	25	25
Lower class	50	50

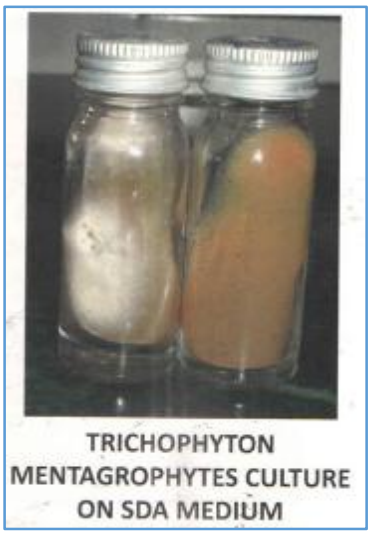
Table 3: Distribution of Cases as per Socioeconomic Status

Highest incidence of infection in low socioeconomic status could be due to poverty, lack of personal hygiene, overcrowding which encourages the spread of infection. 48% of the patients, presented between one to three months from onset of lesions, 36% patients presented less than 1 month after the onset of lesions. Late presentation is probably due to low socioeconomic status and lack of awareness of skin problems.

History	No. of cases	Percentage (%)
Contact with cases	16	16
Contact with animals	10	10
Contact with soil	8	8
Similar complaint	11	11
Total	**45**	**45**

Table 4: History of Contact and Similar Complaint in the Past

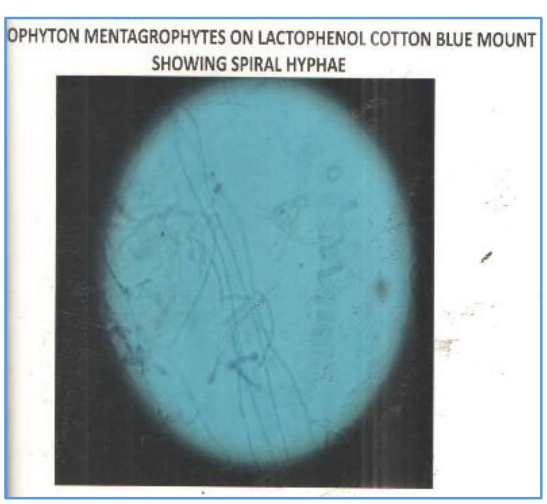
10% of patients had history of contact with the animals like cats, dogs, cattle. This is in contrast with the Jang Su Jeong et al[12] who reported the history of contact with animals was 42.9% of cases. Annular type was the commonest clinical variant observed in 72% cases which is the classical presentation of the disease followed by plaque and eczema. Unexposed sites (71.31%) were more affected when compared to the exposed sites. Among unexposed sites, abdomen was the commonest site (27.5%), followed by anterior chest/inframammary areas which accounted for 18.39%. Warm and humid climate in addition to occlusive clothing resulting in excessive sweating facilitates the involvement of unexposed areas when compared to exposed areas.



TRICHOPHYTON MENTAGROPHYTES CULTURE ON SDA MEDIUM

Species	Number	Percentage
T. Rubrum	46	79.3%
T. Mentagrophyte	8	13.79%
T. Verrucosum	4	6.89%
Total	**58**	**100%**

Table 5: Culture Results



TRICHOPHYTON MENTAGROPHYTES SHOWING POSITIVE UREASE TEST

Dermatophyte Identification Medium: It contains dextrose, neopeptone, Cycloheximide, penicillin, ptomycin and Bromocresol purple. If there is growth of dermatophyte, the colour of the medium changes from greenish blue to purple within 24 to 48 hours after growth.

Urease Test: It is done on Christensen's medium. Trichophyton mentagrophytes strain hydrolyses urea and the medium becomes deep red, while Trichophyton rubrum shows negative results.

Warm and humid climate in addition to occlusive clothing resulting in excessive sweating facilitates the involvement of unexposed areas when compared to exposed areas.

Tinea corporis on or below the waist line is seen in Indian women due to the habit of wearing Saree/Salwar Kameez. 82% KOH positive and 58% positive for culture. Trichophyton rubrum was the most common species isolated (79.3%) which is comparable with Jang Su Jeong et al, followed by T. mentagrophytes (13.79%) and T. verrucosum (6.89%).

Clinical Variant	TR	TM	TV	Total
Annular	40(68.95%)	4(6.85%)	1(1.72%)	45(77.58%)
Plaque	4(6.895%)	2(3.42%)	2(3.44%)	8(13.79%)
Eczematous	2(3.44%)	2(3.42%)	1(1.72%)	5(8.62%)
Sub total	**46(79.3%)**	**8(13.7%)**	**4(6.89%)**	**58(100%)**

Table 6: Correlation between Clinical Variant & Species Isolated

T. rubrum was isolated in 46.8% of culture positive annular, 2.5% of culture positive plaque, 1.3% of culture positive eczematous lesions. T. mentagrophytes were isolated in 6.85% of culture positive annular lesions, 3.42% each from culture positive plaque and eczematous lesions. T. verrucosum was isolated one (1.72%) each from culture positive annular and eczematous lesions, 3.44%(2) was isolated from culture positive plaque lesions in contrast to study by Jang Su Jeong et al in which T. verrucosum was not isolated. However, T. tonsurans, M. canis, M. gypseum, were isolated in their study, which were not isolated in the

present study. Isolation of T. verrucosum in the present study can be explained by contact with cattle in which T. verrucosum is the important zoophilic organism causing dermatophytosis.

Immuno-compromised	No. of Patients	No. of Patients with Extensive T.corporis
Diabetes mellitus	11	6(54%)
Retroviral disease	3	2(66%)
Prolonged Steroid treatment	4	2(50%)
Immunocompetent	82	2(2.43%)

Table 7: Immune Status of the Patients

Out of 100 study subjects, 12 patients had >30% body surface area involved which was considered as extensive involvement in the present study. Morphology of lesions in these patients were confluent annular or plaque type of lesions. Out of 12 patients, 10 were immunocompromised, only 2 were immunocompetent indicating the need to investigate thoroughly.

CONCLUSION: The study highlighted clinical pattern of tinea corporis with male predominance with male-female ratio being 1.63:1, followed by Tinea capitis. The most common age incidence of tinea corporis was between 20-29 years. Most of the patients were from lower socioeconomic strata. Contact with various sources of infection and similar complaints in the past was obtained in 34% and 11% of patients respectively. The duration of illness ranged from one week to four months. Unexposed sites were most effected when compared to exposed sites. Annular lesions (72%) were the most common clinical variant observed. 82% of clinical samples were KOH positive. Culture was positive in 58% of cases. Overall, predominant causative fungal species isolated was Trichophyton rubrum followed by T. mentagrophyte and T. verrucosum. No species specificity was noted in any clinical pattern. All species were isolated from all the clinical variants except for plaque type of lesions in which Trichophyton verrucosum was isolated more frequently. Extensive involvement was noted in 12 patients, majority of them were immunocompromised.

Because of the inhabitant of house hold animals, zoophilic fungi become the dominant pathogen of human beings instead of Anthropophilic, thus fungal species may vary from place to place and even in same continent time to time.

REFERENCES

1. Havlickova B, Czaika VA, Friedrich M. Epidemiological trends in skin mycoses worldwide. Mycoses 2008;51(suppl 4):2-15.
2. Ajello L. Present day concepts in the dermatophytes. Mycopatho Myco Appl 1962;17:315-339.
3. Hay RJ, Moore MK. Dermatophytosis. In: Burns T, Breathnach S, Cox N, et al. ed. Rook's text book of dermatology. 7th edn. Blackwell Science Ltd, Blackwell Publishing Company UK 2004:1-74.
4. Torssander J, Karlsson A, Morfeldt-Mason L, et al. Dermatophytosis and HIV infection: a study in homosexual men. Acta Derm venerol 1988;68(1):53-56.
5. Rippon JW. Dermatophytoses and dermatomycosis. In: Medical mycology, the pathogenic fungi and pathogenic actinomycetes. 2nd edn. Philadelphia: WB Saunders Co 1982:154-248
6. Arbatzis M. Diagnosis of common dermatophyte infections by novel multiplex real time polymerase chain reaction/identification scheme. British journal of Dermatology 2007;157(4):681-689.
7. Vernerkar MP, Pinto MJW, Rodrigues S, et al. Clinico-microbiological study of dermatophytes. Indian J Pathomicrobiol 1991;34(3):186-192.
8. Sharma S, Borthkur AK. A Clinicomycological study of dermatophytoses in north east India. Indian J Dermatol Venerol and Leprol 2007;73(6A):427-428.
9. Agrawalla A, Jacob M, Sethi M. A clinico mycological study of dermatophytoses in Nepal. Journal of dermatology 2001;28(1):16-21.
10. Sen SS, Rasul ES. Dermatophytosis in Assam. Indian J Medical Microbiology 2006;24(1):77-78.
11. Bindu V. Clinico-mycological study of dermatophytosis in Calicut. Indian J Dermatol Venereol Leprol 2002;68(5):259-261.
12. Soo-Jung J, Yong-Beom C, Kyu-Joong A. Clinical and mycological study of Tinea Corporis. Korean J Dermatology 2004;42(2):166-172.